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"Bridging the gap between increasing knowledge and decreasing resources"

Valuation of Environmental Role of *Acacia senegal* Tree in Gum Belt of Kordofan and Blue Nile Sectors, Sudan

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Abstract

Cultivation of *Acacia senegal* is a key component of sedentary farming systems across the gum belt in Sudan, which comprise in addition to the forestry component, crop farming and livestock raising. Gum arabic from *Acacia senegal* tree is major product of the rainfed agricultural sector; it is well perceived for its significant contribution to household income of gum farmers and to foreign exchange earnings of the country. Gum trees provide in addition, a wide range of valuable environmental benefits in form of anti-desertification insurance. They provide also fodder and fuelwood and contribute to increase in crop yield through nitrogen fixation. The study focused on environmental benefits of gum trees within most important producing areas of gum belt in Kordofan and Blue Nile Sectors aiming mainly to finding out values for non marketable goods and services provided by such a tree in terms of soil protection and restoration of soil fertility. Contingent valuation method, hedonic price and replacement cost technique using market-oriented prices were chosen to value environmental effects of gum trees on land quality and to determine share of the tree in carbon sequestration. The valuation process was based on estimating cost of the fertiliser equivalent to the amount of nitrogen provided by gum stands. The internal rate of return (IRR) for a 16-year rotation gum stand was calculated to be approximately 15.2 percent. It was found that gum stands can save considerable cost of supplying ammonia nitrate fertiliser equals to approximately US$ 78 per hectare annually. When ecological benefits and social values associated with gum tree cultivation were considered, the recalculated IRR for 16-year rotation gum stands jumped from 15.2 % to approximately 61 percent.

Keywords: Anti-desertification insurance, contingent valuation method, environmental benefits, gum arabic, gum belt, nitrogen fixation, replacement cost technique

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